

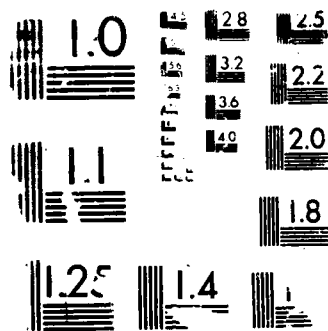
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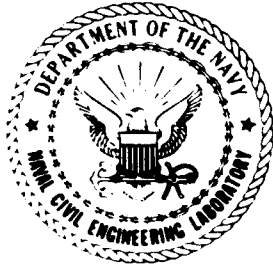




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TECHNICAL REPORTS

R-922

Evaluation of Horizontal Intermodal Shipping Container Connectors for Use Throughout the Marine Corps Field Logistics System, Aug 1987, R.H. Seabold, B. Posadas, C.R. Sarsfield, and L.G. Nixon (limited release)

Alternative horizontal intermodal shipping container connectors were rank ordered in regard to their total benefit. The connectors are qualified in regard to structural adequacy for use throughout the Marine Corps Field Logistics System. Five different products, one each from five different suppliers, were evaluated by a committee using unidimensional multiparameter utility theory. The parameters were weight, ease of operation, ancillary tools, self containment, and safety. The Peck and Hale connector, CTC-1012-23-1, was evaluated as best. It is completely self-contained, having no loose parts, and requires no ancillary tools. It is also second in lightness of weight, weighing only 9 pounds. A benefit-cost analysis is recommended to revise the rank order as necessary to include cost considerations without benefit or cost bias. Operational testing with Marine Corps quadruple containers (QUADCONS) is also recommended.

R-923

Testing of Horizontal Intermodal Shipping Container Connectors for Use Throughout the Marine Corps Field Logistics System, Aug 1987, R.H. Seabold, B. Posadas, C.R. Sarsfield, and L.G. Nixon (limited release)

Horizontal intermodal shipping container connectors were tested in a laboratory to qualify or disqualify them in regard to structural adequacy for use throughout the Marine Corps Field Logistics System (FLS). Criteria included those in the standards of the International Organization for Standardization (ISO) and the rules published by the American Bureau of Shipping (ABS). Five different designs, one each from five different suppliers, were tested. In each case some specimens were tested in tension, others in compression, and others in shear. All the connectors passed all the tests.

TECHNICAL NOTES

N-1766

Recycling of Portland Cement Concrete Airfield Pavements - An Experimental Investigation, Jul 1987, M.C. Hironaka, G.D. Cline, and N.F. Shoemaker (public release)

The objective of this study was to develop criteria and guidelines for recycling portland cement concrete (PCC) airfield aprons. Included in this study are all aspects of the recycling process including breakup

and removal, steel reinforcement removal, crushing, screening, stockpiling, mix design, testing, placing, finishing, and performance. Recycling of PCC requires some specialized equipment such as pavement breakers and electromagnets for steel removal; however, all of the other equipment and procedures are those commonly used in the construction industry. Based on the regression experimental design procedure and laboratory tests conducted on pavement samples from six airports of widely varying age and conditions, it has been conclusively shown that aged PCC pavements can be recycled into new surface courses that meet strength requirements and have the same cyclic load carrying (fatigue) characteristics as those constructed with virgin materials. The optimum values for proportions that should be used in recycle mixes are: water/cement ratio - 0.46, coarse aggregate content - 58 percent and virgin sand content - 42 percent. Because the fines generated from the crushing of the old pavement degrade the strength of recycled concrete, their use is not recommended for recycled heavy duty airfield pavements.

N-1774

Single and Tandem Anchor Performance of the New Navy Mooring Anchor: The NAVMOOR Anchor, Jul 1987, Robert J. Taylor (public release)

A new Navy mooring anchor (NAVMOOR), has been designed to satisfy a variety of Navy anchor applications. Various sizes of anchors have been designed, fabricated, and structurally and operationally proof-tested. This report describes the NAVMOOR Anchor, presents the results of prototype single and tandem anchor tests in sand and mud seafloors, provides anchor performance specifications, and presents Navy fleet mooring anchoring guidelines. The NAVMOOR Anchor was shown to be structurally and operationally superior to the Navy's STATO Anchor which in the past was the most effective general purpose anchor for Navy applications. The NAVMOOR Anchor was effective in dense sand and soft mud seafloors when used in single and tandem anchor leg configurations. Tandem anchor system holding capacity was shown to be at least twice the capacity of a single NAVMOOR Anchor. The Navy's fleet mooring requirements from class C (100-kip capacity) to class AAA (500-kip capacity) can be satisfied with only two sizes of NAVMOOR Anchor, the 10,000-pound and 15,000-pound NAVMOOR, used in various single and tandem anchor leg configurations.

N-1775

SEADYN87 User's Manual, Jul 1987, R.L. Webster (Consulting Engr, Brigham City, UT 84302) and T.P. McAllister (NCEL) (public release)

This document is a revision of TN-1630, April 1982. This report describes the input structure and general use of the nonlinear cable dynamics computer model SEADYN. This program performs static, time and frequency domain dynamic, and modal analyses for arbitrarily configured cable-truss structures. Significant capabilities include: multi-materials, bottom interaction, nonlinear material properties, material damping, payout reel-in, strumming effects, spatially varying current fields, imposed motions, and random wave loading. Results can be saved and reused during the current execution or at a later date. A free-field input reader is used.

N-1776

Boiler Stack Gas Heat Recovery, Sep 1987, P.C. Lu, T.T. Fu, S.C. Garg, and G. Nowakowski (public release)

This report is a detailed study of various heat recovery schemes for Navy shore facilities to utilize otherwise lost stack heat. The waste heat can be used alternatively to improve the boiler efficiency through feedwater and/or combustion-air preheating, or to lighten the boiler load through process-steam/water heating. The procedure for estimating the energy potential of a given flue-gas stream is explained in detail with sample plots. Based upon economic analysis of available options, three cost-effective methods of recovering waste heat were identified: the conventional economizer, the direct-contact heat exchanger, and the indirect-contact condensing heat exchanger with temperature-raising by heat pumps, if appropriate. Important items such as materials, corrosion, maintenance, control, and retrofit are discussed. It is recommended that the entire process of selection and planning be incorporated in Computer Aided Engineering (CAE) software, and the conclusions be verified by testing in an actual retrofit unit.

CONTRACT REPORTS

CR 87.012

US Army 231B Fuel Barge Modifications and Mooring Design: Final Report, Aug 1987, Giannotti & Associates, Inc, Ventura, CA, N00123-84-D-0235-ZZ13, (limited release)

This report covers the modification of an Army 231B Liquid Cargo Barge to be the basic component of the 1-Mile Amphibious Fuel Transfer System. The barge was modified to meet American Bureau of Shipping (ABS) and U.S. Coast Guard (USCG) requirements for a manned ocean-going barge with an international loadline. The report includes a mooring design, barge modifications and systems integration, operating procedures for mooring and ship-to-shore hoseline deployment/retrieval, purchase descriptions, USCG and ABS review, vessel motion and deck wetness analysis, damage and intact stability analysis, stabilization techniques review for a barge, and drawings. The NAVMOOR-4 anchor was designed as part of this work.

CR 87.013

Phase II Monitoring Study of Plastic Media Blasting at Hill Air Force Base, Utah, Aug 1987, Engineering Management Concepts, Camarillo, CA, N00123-85-D-0191 (limited release)

The new walk-in booth at Hill Air Force Base, Utah, was monitored for dust, metal, and chemical concentrations in the airstream as well as air velocity and volume. Lead and barium in the dust exceeded Personnel Exposure Limits (PEL). None of the chemicals measured (formaldehyde, phenol, and diisocyanate) exceeded the PEL. The dust level did not exceed the American National Standards Institute (ANSI) explosive standards. Ventilation rates of 62 feet per minute (fpm) provided good visibility in the blast room even though ventilation design created turbulence in the center of the room.

1987 TECHDATA SHEETS

<u>No.</u>	<u>Title</u>	<u>NCEL Contact</u>	<u>Ext</u>
87-01	Security Enclosures for Low-Security Structures (limited release)	E. Elkins	5927
87-02	Security Padlocks and Exterior Ordnance Lock (limited release)	B. Leek	5927/ 4284
87-03	Single Building Energy Controllers Can Save Energy \$\$ (public release)	K. Canfield	4188
87-04	Security Hasps, Anti-Intrusion Bar, and Universal Security System for Naval Environments (limited release)	B. Leek	5927/ 4284
87-05	The NAVMOOR Anchor (public release)	R. Taylor	5419
87-06	Polyvinyl Chloride (PVC) Wraps Reduce the Cost of Maintaining Timber Piling	D. Pendleton	5377
87-07	Single-ply Roofing System	R.L. Alumbaugh E.F. Humm	4679 5793
83-08R	Drag Embedment Anchors for Navy Moorings (public release)	R. Taylor	5419

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